

## DEVICE FOR APPLYING AT LEAST TWO STRAPS AROUND A PACKET

The invention relates to a device for arranging at least  
5 two bands around one or more packets, substantially  
consisting of a frame, a lying conveyor belt supported by the  
frame for moving forward the packets, band clamping and  
guiding means which move transversely of the conveyor belt  
away from and toward each other and which are connected to  
10 associated supply reels for the strapping band, welding means  
for welding together the bands which have been moved toward  
each other.

Such devices for strapping a number of packets using a  
band are for instance described in the patents NL 7314312 and  
15 EP 98202234 in the name of applicant. These embodiments have  
the drawback that the device is only suitable for arranging  
one or more bands of the same type per passage of the one or  
more packets. Particularly when high packets must be  
strapped, according to the prior art the packet for strapping  
20 must pass through different devices.

The invention has for its object to provide a device and  
a method whereby two or more bands, which can be of different  
types, are arranged in one passage of the packets for  
strapping and wherein the packet can be provided with a  
25 label.

For this purpose the invention is distinguished by a  
first group of band clamping and guiding means which has a  
first pair of jaws for a first band type and a second group  
which has a second pair of jaws for a second band type, which  
30 groups are arranged one above the other.

In this manner the one or more packets can be strapped  
with two or more bands of a specific type, for instance

subject to the required firmness, via one passage through the device according to the invention.

According to a first embodiment relating to a strapping with two bands, the two lower and the two upper band portions  
5 are brought toward each other in one movement, whereupon both pairs of band portions are fixedly clamped and are then separated and welded in a known manner, as described for instance in NL 7314312.

According to a second embodiment relating to a strapping  
10 with two bands, the upper band parts are first moved toward each other, separated and welded, whereafter the carrier of the welding means is moved downward to the lower band portions, which are then separated and welded. This second embodiment has the advantage that only one carrier provided  
15 with welding means for any type of band is required.

It will further be apparent that both embodiments can be readily enlarged into devices for strapping with more than two bands.

One group of band clamping and guiding means is  
20 preferably suitable for a band of the film type. This type of band has the advantage that it can easily be provided with a means of identification, for instance by printing text or adhering a label thereto. On the other hand, this type of band is more expensive than the standard strapping bands, and  
25 since it generally suffices to arrange only labels on this type of band, a cheaper type can be chosen for the other band or bands.

According to an embodiment, the second band is wider than the first band, wherein the wider band can for instance then  
30 be provided in practical manner with a means of identification.

In a first preferred embodiment of the device according to the invention, each jaw of the first pair of jaws has a

clamping surface which runs transversely relative to the direction of movement and which co-acts with a counter-surface of an intermediate body carried by one of the jaws, wherein at least one of the surfaces is provided with tooth-like protrusions lying in a direction opposite to the pulling direction.

According to another feature of the present invention, each jaw of the second pair of jaws, which is for instance suitable for arranging a band of the film type, has a guide surface which runs transversely relative to the direction of movement and which co-acts in each case with a motor-driven supply roll. The setting of the speed of the conveyor belt and the speed of the rolls ensures that the film can be placed round the packet with a randomly adjustable tension.

The invention further relates to a method for arranging at least two bands one above the other around one or more packets, wherein each band, which is formed by fastening together at their outer ends two bands unrolled in each case from a supply roll, is trained in a U-shape round the or each packet, whereupon each pair of band portions extending around the or each packet in a U-shape are pressed toward each other along the object, adhered to each other and severed such that a band again extends between each pair of supply rolls.

The method is distinguished in that the type of the at least two bands is chosen according to the height on the one or more packets, and that for each band each of the two band portions pressed toward each other is fixedly clamped, moved toward each other, welded together and separated.

This method makes it possible to firmly strap the one or more packets in one passage thereof with at least two bands, the type of which is related to the height position on the packets.

According to a first variant of the method according to the invention, each band of the bands to be arranged one above the other is fixedly clamped, welded together and separated simultaneously and in one movement.

5        According to another variant of the method according to the invention each band of the bands to be arranged one above the other is successively sought, fixedly clamped, welded together and separated. In this manner only one pair of clamping and welding jaws is required for arranging each band  
10 of the same type.

The invention will be further elucidated with reference to the annexed drawing and the figure description hereinbelow, in which a number of embodiments of the device according to the invention are illustrated.

15        In the drawing:

figure 1 shows a perspective view of a first embodiment of the device according to the invention;

figure 2 shows a perspective view of a second embodiment of the device according to the invention;

20        figure 3 shows a perspective detail view of the band clamping and guiding means of the embodiment shown in figure 2;

figures 4 and 5 show perspective views of the band clamping and guiding means of the embodiment shown in figure  
25 2 during a possible embodiment of the method according to the invention.

According to a first embodiment, and as shown in figure 1, the device has a portal-like frame 1, although the skilled person will appreciate that this frame can take a random  
30 form. Running below the portal is a conveyor belt 2 for moving the packets P for strapping in the direction of arrow 1.

The band B1 and film B2 for arranging are pulled respectively from supply reels 3 and 4 (see arrow P2) and guided to clamping and welding jaws 7 and 8 via resistance mechanisms and return pulleys (not shown). A corresponding configuration can be found on the other side of the portal. In the drawing the welding jaws 7 and 8 are each provided with separate support frames, although it will be apparent that they can equally well be mounted on the same support frame when the two bands are moved towards each other in a single movement.

Both ends of band B1 and film B2 respectively are in each case welded together at 9 and 10 respectively. The clamping and welding jaws 7, 8 are moved toward each other, wherein band B1 and film B2 are nestled under tension against the rear side of the packets P for strapping.

Band B1 and film B2 are then clamped fixedly on either side, whereupon the band and the film are cut through on both sides and the corresponding band and film ends are welded together.

Each clamping jaw 7 of the band B1 which in this embodiment is of the strap type, is advantageously embodied with a clamping surface which is provided with teeth protruding in a direction opposite to the pulling direction in order to prevent slippage resulting from the tensile force. Such clamping jaws are described in detail in the European patent application EP 98202234 of applicant.

Each clamping jaw 8 of band B2, which in this embodiment is of the film type, has a guide surface which runs transversely relative to the direction of movement and which co-acts in each case with a motor-driven supply reel 4. The setting of the speed of conveyor belt 2 and the speed of rolls 4 ensures that the film can be placed round the packet with a randomly adjustable tension.

A second embodiment is shown in figure 2. Frame 1 is provided on either side with a support frame 11 with clamping and welding means, which support frames are shown in detail in figure 3.

5 At the top of the support frame are arranged guiding and welding means 8 for a band B2 of the film type, while clamping and welding means 7 for a band B1 of the strap type are built in at the bottom. The latter has a left-hand and right-hand welding jaw 13, 13' which are built into a two-  
10 part sleeve-like housing 14. Band portions B1 are guided over respective guide surfaces 15, 15'. For a detailed description of all components of these jaws reference is made to the patent EP 0 890 510 of applicant.

As shown in figure 2, frame 1 is provided with a  
15 motorized beam 12 to which the support frames 11 are connected, which beam 12 can be moved up and downward using control means, as designated with arrow P4, such that the height of support frames 11 can be adjusted. Control means are likewise further provided for carrying support frames 11  
20 towards each other in the direction of arrow P5.

The method of the invention wherein each band of the bands to be arranged one above the other is successively sought, fixedly clamped, welded together and separated, is illustrated with reference to figures 4 and 5. Step (a) of  
25 figure 4 shows the step wherein a band B1 of the strap type has been sought and taken up by the guiding means. Both support frames are then moved towards each other until the lower pair of welding jaws are mutually engaging, as shown in steps b and c. In step c the band portions are adhered to  
30 each other and separated. The band of the strap type B1 is then sealed round the one or more packets and also separated from the band parts coming from supply rolls 3 with their ends fixed to each other, so that the support frames can move

back away from each other (step(d)) and a subsequent band can be sought.

Figure 5 shows the different steps of the movement of support frames 11 when a band of the film type is taken up.

5 Both support frames 11 are moved toward each other until the lower pair of guiding and welding jaws are mutually engaging, as shown in steps b and c, whereupon the upper pair of guiding jaws 8 are moved toward each other, as shown in step d. The band portions are then adhered to each other and  
10 separated. The band of film type B2 is then closed round the one or more packets and also separated from the band parts coming from motorized supply rolls 4 with their ends fixed to each other, so that support frames 11 can be moved back away from each other (steps (d)) and a subsequent band can be  
15 sought, or the strapped packets can be transported further when all bands B1, B2 have been arranged.

The invention is not limited to the above described embodiment; it is thus also possible for instance to provide the device with three groups of band clamping and guiding  
20 means, with which three different band types can be arranged.